

What is claimed is:

1. An acoustic sensor module comprising:

a first end plate including an aperture;

a second end plate removably attached to said first end plate at a distance from said first end plate, said distance along an axis perpendicular to a face of said first end plate and to a face of said second end plate;

a tube positioned along said axis and passing through said first and second end plates;

a sensing system positioned at an exterior periphery of said tube;

a conductor with a first connection and a second connection, said conductor electrically conductive to said sensing system at said first connection and fittable to said first end plate aperture at said second connection; and

a shell formed of a lightweight composite and positioned within said distance, wherein said shell encapsulates said tube, said sensing system and said conductor to said aperture.

2. The acoustic sensor module in accordance with claim 1, wherein said sensing system comprises at least four transducers positioned along said exterior periphery of said tube;

wherein at least two of said transducers are hydrophones;
and

wherein at least two of said transducers are acoustic projectors.

3. The acoustic sensor module in accordance with claim 2 wherein the positioning of said transducers includes polyurethane as an adhesive to said exterior periphery.

4. The acoustic sensor in accordance with claim 3 wherein said lightweight composite comprises epoxy.

5. The acoustic sensor in accordance with claim 4 wherein said lightweight composite further comprises a micro-sphere resin.

6. The acoustic sensor in accordance with claim 5 wherein said lightweight composite further includes hollow macro-spheres.

7. The acoustic sensor in accordance with claim 6 wherein said first end plate further comprises guide plates extending from the periphery of said first end plate, wherein said guide plates are mountable to a retrieval system for said acoustic sensor module.

8. A method of fabricating a lightweight watertight acoustic sensor module, said method comprising the steps of:

providing an assembly comprising a first end plate

including an aperture, a second end plate removably attached to said first end plate at a distance from said first end plate and a passage tube within said distance and along an axis through said end plates;

adhering a sensing system to an exterior periphery of said passage tube;

fitting a conductor electrically conductive to said sensing system to said first end plate aperture;

surrounding the exterior dimensions of said assembly within
said distance with a casting;

injecting a lightweight composite between said passage tube
and said casting;

encapsulating said assembly with said composite within said
distance;

curing said composite; and

removing said casting to form said lightweight watertight
acoustic sensor module.

9. The method in accordance with claim 8 wherein said method
further comprises the step of adding a micro-sphere resin to
said lightweight composite.

10. The method in accordance with claim 9 wherein said method
further comprises the step of adding hollow macro-spheres to
said lightweight composite.